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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/807,298	04/09/2001	Frank Leonard Schadt III	PE0612	5947

23906 7590 01/20/2004

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4417 LANCASTER PIKE
WILMINGTON, DE 19805

EXAMINER

THORNTON, YVETTE C

ART UNIT	PAPER NUMBER
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1752

DATE MAILED: 01/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/807,298

Applicant(s)

SCHADT III ET AL.

Examiner

Yvette C. Thornton

Art Unit

1752

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 October 2003.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 10-15 and 27-33 is/are rejected.
- 7) ☒ Claim(s) 5-9, 16-26 and 34 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 April 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

This is written in reference to application number 09/807298 filed on April 9, 2001.

Response to Amendment

1. Claims 1-34 are currently pending.
2. The amendment to the specification is sufficient to overcome the new matter objection set forth in the previous office action.

Claim Interpretations

3. The examiner has interpreted the instant claims as referring to a photoresist composition comprising a branched type polymer having a linear backbone and sidearms, which have at least two repeating units and a Mn of at least 1000 and a photoacid generator.

Claim Rejections - 35 USC § 102

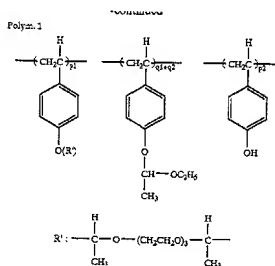
4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

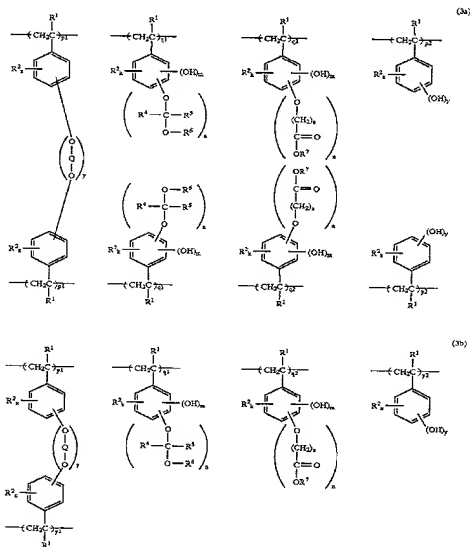
5. Claims 1-4, 10-15 and 27-33 are rejected under 35 U.S.C. 102(e) as being anticipated by Watanabe et al. (US 5,942,367 A). Watanabe exemplifies in example 20, a resist composition comprising a polymer, a photoacid generator, a dissolution controller, a basic

compound and a solvent mixture of propylene glycol methyl ether acetate (PGMEA) and cyclohexanone (CH) (see also ex. 1-19 and 21-27). The said polymer has the structure:



(see table 3; ex. 20; c. 81, l. 1-20). Watanabe teaches that

the said polymer would crosslink to form an intermolecular linkage or an intramolecular linkage such as those represented by formula (3a) or (3b), below (see c. 25. I. 40-c. 30, I. 13).



Preferably the amount of the acid labile group and the crosslinking group combined is on the average more than 0 mol% to 80 mol%. By properly selecting the amounts of the crosslinking group having a C-O-C linkage and the acid labile group within the taught range, the size and configuration of a resist pattern can be controlled as desired (c. 29, l. 26-35). It is the examiner's position that the taught polymer meets the limitations of the instant claims wherein the crosslinking process introduces branches onto the polymer backbone, which have repeating units. The exemplified photoacid generator, dissolution controller and solvent meet the limitations of the claimed photoacid generator, dissolution inhibitor and solvent of instant claims 1, 15 and 31, respectively.

Watanabe further exemplifies a process wherein the composition of example 20 was spin coated on a silicon wafer. With the wafer rested on a hot plate, the coating was pre-baked for 90 seconds. The formed film was exposed to light by means of an excimer laser stepper through a mask having a desired pattern, baked at 110°C and developed with an aqueous solution of TMAH for 60 seconds to produce a positive pattern (c. 88, l. 1-12).

Watanabe teaches that the taught composition is best suited for fine patterning with actinic radiation especially radiation having a wavelength of 254-193 nm such as deep UV, excimer laser light, X-ray or electron beam (c. 76, l. 53-c. 77, l. 26). One of ordinary skill in the art would readily envisage a process wherein the exemplified composition is exposed to deep UV light.

Response to Arguments

6. Applicant's arguments filed October 22, 2003 have been fully considered but they are not persuasive.

7. Applicants argue that the Watanabe reference does not suggest or teach a comb polymer having a distinct backbone and side arm segments as set forth by the present invention. The examiner disagrees. The present specification defines a comb polymer as a branched polymer, which has branched segments known as polymer arms (side-arms) (spec. pg. 5, l. 13-23). The examiner maintains the position that polymer of Watanabe meets the limitations of a branched polymer wherein the backbone is formed by the interacting (CH-CR1) repeating units and the branches are formed by the "n" and "y" repeating units off the aromatic substituent.

8. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., absorbance) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

9. Applicants also argue that the Watanabe reference teaches a very different approach to photoresist chemistry, which causes the breakdown of cross-links. Whereas the present invention is directed to a chemistry where photo-exposure causes a breakdown of function groups. The examiner is of the position that claims 1-4, 10-15 and 30 do not require a photo-exposure step or any other method steps. Instant claims 27-29 and 32-33 pertain to a process wherein a branched polymer contains "sufficient functionality to render the photoresist developable to afford a relief image upon exposure to radiation and subsequent heating". Watanabe clearly teaches a process wherein the composition of example 20 is spin-coated on a silicon wafer. With the wafer rested on a hot plate, the coating is pre-baked for

90 seconds. The formed film was exposed to light by means of an excimer laser stepper through a mask having a desired pattern, baked at 110°C and developed with an aqueous solution of TMAH for 60 seconds to produce a positive pattern (c. 88, l. 1-12). Watanabe teaches that the taught composition is best suited for fine patterning with actinic radiation especially radiation having a wavelength of 254-193 nm such as deep UV, excimer laser light, X-ray or electron beam (c. 76, l. 53-c. 77, l. 26). One of ordinary skill in the art would readily envisage a process wherein the exemplified composition is exposed to deep UV light. The claims as written do not require a breakdown of functional group as opposed to the breakdown of cross-links. The claims merely require "sufficient functionality to render a photoresist developable to render an image", which Watanabe clearly discloses.

10. The examiner maintains the position of record.

Allowable Subject Matter

11. Claims 5-9, 16-26 and 34 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

12. The following is a statement of reasons for the indication of allowable subject matter: review of the prior art failed to teach and/or suggest a photoresist composition as set forth in instant claims 5 and 6 wherein the photoacid generator is covalently bonded to the branched chain; a branched polymer comprising acrylate polymer, methacrylate polymer or combination thereof as in instant claims 9, 16 and 34; or a fluorine-containing copolymer in combination with a photogenerator as set forth in instant claims 17 and 21. Fluorinated compounds are known in the art however, the examiner failed to find a reference with had a

filing date which was citable as prior art. The examiner directs the applicant's attention to US 2001/0018162 A1 and US 2001/0010890 A1.

Conclusion

13. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).
14. A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.
15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yvette C. Thornton whose telephone number is 571-272-1336. The examiner can normally be reached on Monday-Thursday 8-6:30.
16. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark F. Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.
17. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571-272-1300.

Application/Control Number: 09/807,298

Art Unit: 1752

Page 8

A handwritten signature in cursive script, reading "Yvette C. Thornton". The signature is written in dark ink and is positioned above the printed name.

Yvette Clarke Thornton

Patent Examiner

Art Unit 1752

yct

January 10, 2004